



**FDSP780**

### Description

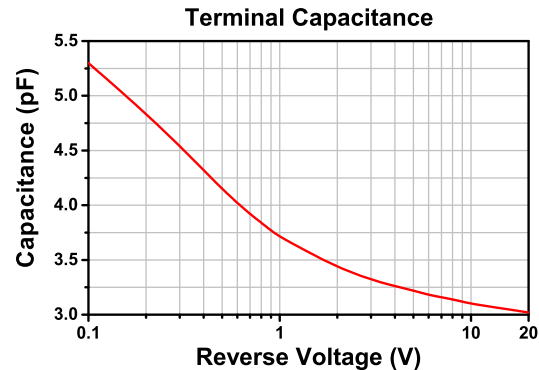
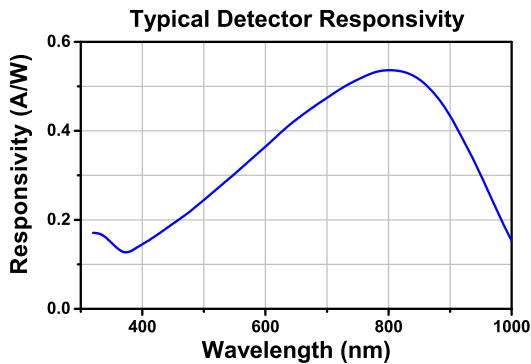
The FDSP780 is a high-speed, pigtailed silicon PIN photodiode designed for light detection in the near infrared range. These photodiodes provide wideband characteristics at a low bias voltage, ideal for use in optical communications, high-speed photometry and monitoring applications. The device housing is a stainless steel bushing used for active coupling of the fiber to the photodiode. The fiber is reinforced with a Ø900 µm loose tube outer jacket and a rubber boot, which relieves fiber bending stresses. The FDSP780 uses Nufern 780-HP single mode fiber with a core diameter of 5 µm and a numerical aperture of 0.13.

The FDSP780 is particularly suitable for measurements of pulsed or CW fiber-coupled light sources by converting the optical power into an electrical current. The conversion coefficient (responsivity) is wavelength dependent. The figure to the lower left shows a typical curve.

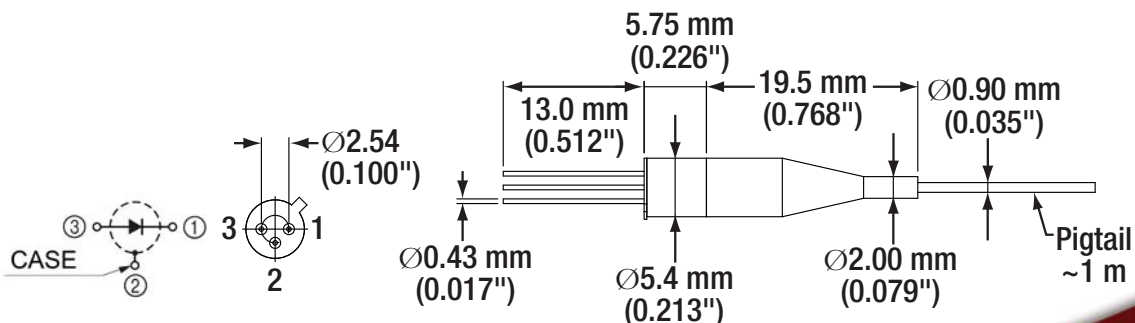
The bandwidth  $f_{BW}$  and the rise time response  $T_R$  are dependent on the photodiode capacitance  $C_J$  and the load resistance  $R_{LOAD}$ :

$$f_{BW} = \frac{1}{2\pi R_{LOAD} C_J}, \quad T_R = \frac{0.35}{f_{BW}}$$

By applying a bias voltage between photodiode cathode and circuit ground, the diode capacitance can be decreased. The figure to the lower right shows the typical dependency of the diode capacitance versus bias voltage.



### Drawing



## Specifications

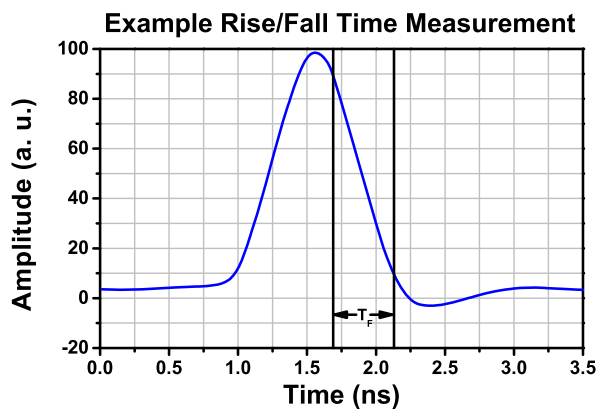
Fiber Specifications	
Wavelength Range	780 - 970 nm
Fiber	Nufern 780-HP, Single Mode
Core Diameter	5 $\mu\text{m}$
Numerical Aperture	0.13
Back Reflections	< -40 dB

Detector Specifications	
Detector Type	Silicon/PIN
Peak Responsivity	0.58 A/W @ 800 nm
Active Area Diameter	0.8 mm
Rise/Fall Time ( $R_L = 50 \Omega$ , $V_{\text{Bias}} = 12 \text{ V}$ ) <sup>a</sup>	700 ps
Dark Current <sup>b</sup>	0.01 nA (Typical) 0.5 nA (Max)
Terminal Capacitance <sup>b</sup>	3 pF
NEP <sup>b</sup>	$3.1 \times 10^{-15} \text{ W}/\sqrt{\text{Hz}}$
Optical Input Power (Max)	50 mW
Reverse Voltage (Max)	20 V
Forward Current (Max)	10 mA
Operating Temperature	5 to 70 °C

- a. An example measurement of the rise/fall time is provided below.  
b. For a 10 V reverse bias voltage.



## Rise/Fall Time



The data plotted above shows an example of the measurement used to determine the rise and fall times of these pigtailed photodiodes.